

Remarks/Arguments

Applicant appreciates the helpful feedback and guidance received from Examiner Hirl in the "Reponse to Arguments" and "Examination Considerations" of the Office communication mailed March 4, 2005. The claims are amended to incorporate the feedback from the Office communication.

Claim Rejections – 35 USC §103

The detailed remarks replying to Examiner Hirl's "Reponse to Arguments" are discussed for each claim as follows:

Claim 1

(1) To address Examiner Hirl's feedback (Para 13) that "It is not apparent that the specification and the drawings contain subject matter that is novel and non obvious," applicant would like to highlight the Claim 1 related patentable material as follows:

The prior art decision tree methods such as CART, C4.5, and CHAID (Berry p.252-267) are crisp decision trees. A crisp decision tree makes decisions following a definitive path of decision structure and assigns a class unequivocally to an input sample. The methods cannot differentiate the decisions for a sample close to the decision boundary (sample value close to the decision threshold value) and a sample far from the decision boundary. In applications that require generalization or in applications where the training data cannot accurately predict decision boundaries or when the input samples are subject to noise and therefore perturb around the decision boundaries, a smooth decision around a decision boundary is desirable and should achieve more robust results.

The regulation methods of the current invention allow the adjustment between the crisp decision and the probabilistic decision to achieve smooth (rather than ridge) decision. This is very useful and is un-suggested in the prior arts. It is non obvious as evidenced by the fact that many years have past since the reveal of the prior arts yet the approach of the current invention has never been created in the art.

(2) To address Examiner Hirl's feedback that "the claims fail to define a subject matter worthy of being patented", and "The claims and only the claims form the metes and bounds of the invention.", applicant amended the claims to define the patentable material containing in the specifications as follows:

Claim 1, step (e) is amended to include the patentable material in the specification (Pages 11-13). The amended step (e) clearly states the selection of regulation parameters for adjustment between the crisp tree and the probabilistic tree and for weakening the likelihood values for terminal nodes having a small number of training samples.

(3) To address Examiner Hirl's feedback that "The claims and only the claims form the metes and bounds of the invention" and "The examiner has full latitude to interpret each claim in the broadest reasonable sense", applicant amend the claims to add limitations to clearly differentiate the statistics of the current invention and prior art measurements.

Claim 1, step (c) and setup (d) are amended to add "distance-to-threshold" and "likelihood value" limitations.

(4) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicants respectfully submit that the amended claim 1 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 2-4 are canceled

Claim 5

(1) To address Examiner Hirl's feedback that "Claim 5 is written too broad to expect the Examiner to narrowly interpret the intention.", "Limitations appearing in the specification but not recited in the claim are not read into the claim. Application's statements are not part of claim5", applicant amended the claims to clearly define the patentable material containing in the specifications and add limitations to differentiate the current invention and prior art methods as follows:

Claim 5, step (b) is amended to clearly define the likelihood values for non-terminal node based on the specification pages 11-13.

Claim 5, step (c) is amended to clearly define the branch likelihood values for terminal node based on the specification pages 13-14.

Claim 5, step (d) is amended to clearly define the confidence value for a class based on the specification page 13.

(2) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicants respectfully submit that the amended claim 5 has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 6-11 are canceled

Claims 12

(1) To address Examiner Hirl's feedback (Para 13) that "It is not apparent that the specification and the drawings contain subject matter that is novel and non obvious," applicant would like to highlight the Claim 12 related patentable material as follows:

The prior art decision tree methods such as CART, C4.5, and CHAID (Berry p.252-267) are static decision trees that have fixed tree structure and decision parameters after training. They are not designed to allow for incremental update. There is no easy way to incrementally update a prior art decision rule using new training samples after the tree is constructed. Alternatively, completely new rules are constructed when new samples are available. However, the new rules may have very different performance characteristics from the old ones. This is not desirable in critical applications where performance characteristics should be stable and update learning should change the performance characteristic gracefully.

Claim 12 is related to a current invention that allows the incremental update learning of non-terminal node parameters (distance-to-threshold statistics). This is facilitated by the unique storing and updating of the accumulated distance, accumulated weight and accumulated square distance or weighted distance histogram in each non-terminal node. This is very useful and is un-suggested in the prior arts. It is non obvious as evidenced by the fact that many years have past since the reveal of the prior arts yet the approach of the current invention has never been created in the art.

(2) To address Examiner Hirl's feedback that "the claims fail to define a subject matter worthy of being patented", and "The claims and only the claims form the metes and bounds of the invention.", applicant amended the claims to define the patentable material containing in the specifications as follows:

Claim 12, step (d) is amended to include the patentable material in the specification (Page 17). The amended step (d) clearly states the update of the distance-to-threshold statistics using accumulated distance, accumulated weight and accumulated square distance.

(3) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicant respectfully submits that the amended claim 12 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 13

Claim 13 is amended to define the weighted distance histogram as non-terminal node distance-to-threshold statistics.

Applicant respectfully submits that the weighted distance histogram is not anticipated in the prior art neither is it obvious to one of ordinary skill in the art. Therefore, the amended claim 13 is in condition for allowance based on the above remark.

Claim 14

(1) To address Examiner Hirl's feedback (Para 13) that "It is not apparent that the specification and the drawings contain subject matter that is novel and non obvious," applicant would like to highlight the Claim 14 related patentable material as follows:

As stated in the above remarks for Claim 12, the prior art decision tree methods are not designed to allow for incremental update. Claim 14 is related to a current invention that allows the incremental update of not only new sample but also new classes. This is done in a stable fashion using a compound tree approach. In the compound tree structure, new rule is created for new class yet the old rules are maintained for existing classes and the update learning change the performance characteristic of the existing classes gracefully. This is very useful and is un-suggested in the prior arts. It is non obvious as evidenced by the fact that many years have past since the reveal of the prior arts yet the approach of the current invention has never been created in the art.

(2) To address Examiner Hirl's feedback (Para 13) that "the claims fail to define a subject matter worthy of being patented", applicant amended the claims to define the patentable material containing in the specifications as follows:

Claim 14, step (a) is amended to include the patentable material in the specification (Page 18 and Figure 6). The amended step (a) clearly defines the novel compound tree structure.

Claim 14, step (b) is amended to include the patentable material in the specification (Page 19). The amended step (b) clearly defines the compound tree update method.

(3) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicant respectfully submits that the amended claim 14 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 15-16 are canceled

Claim 17

(1) To address Examiner Hirl's feedback (Para 13) that "It is not apparent that the specification and the drawings contain subject matter that is novel and non obvious," applicant would like to highlight the Claim 17 related patentable material as follows:

As stated in the above remarks for Claim 14, the prior art decision tree methods are not designed to allow for incremental update and Claim 14 defines a current invention allowing the update of not only new sample but also new classes using a novel compound tree method.

Claim 17 is related to the application of the novel compound tree method to a new sample. It is very useful and is un-suggested in the prior arts. It is non obvious as evidenced by the fact that many years have past since the reveal of the prior arts yet the approach of the current invention has never been created in the art.

(2) To address Examiner Hirl's feedback that "the claims fail to define a subject matter worthy of being patented", applicant amended the claims to define the patentable material containing in the specifications as follows:

Claim 17, step (c) is amended to include the patentable material. The amended step (c) clearly defines the method for combining the results from all trees as disclosed in Page 19 and Figure 8 of the specification.

(3) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicants respectfully submit that the amended claim 17 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 20

(1) To address Examiner Hirl's feedback (Para 13) that "It is not apparent that the specification and the drawings contain subject matter that is novel and non obvious," applicant would like to highlight the Claim 20 related patentable material as follows:

The prior art decision tree methods such as CART, C4.5, and CHAID (Berry p.252-267) are single tree based decision method. This is a limitation for decisions near the decision boundaries. Claim 20 is related to a current invention that improves the decision accuracy by multiple stages of trees focusing toward the detailed decisions near the decision boundaries through further stages of processing. This is accomplished by

increasing weights to the training samples that are close to decision boundaries and decreasing weights for samples that are far away from the decision boundaries and also by constructing an additional regulation tree (called a focusing tree) using the new weights. It is very useful and is un-suggested in the prior arts. It is non obvious as evidenced by the fact that many years have past since the reveal of the prior arts yet the approach of the current invention has never been created in the art.

(2) To address Examiner Hirl's feedback that "the claims fail to define a subject matter worthy of being patented", applicant amended the claims to define the patentable material containing in the specifications as follows:

Claim 20, step (b) is amended to include the patentable material. The amended step (b) clearly defines the method for generating new weight for new tree generation.

(3) Other changes are made to the claim to add additional limitations and improve writing style for further clarification.

Applicants respectfully submit that the amended claim 20 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 21-24 are canceled

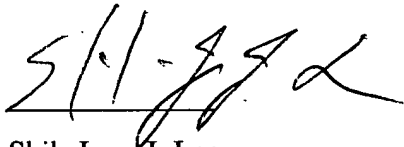
Conclusion

In view of the amendments and above remarks and arguments, applicant submits that all claims are patentably over the prior art and all claim rejections under 35 USC §103 are overcome. Therefore Applicant submits that this application is in condition for allowance, which action Applicant respectfully solicits.

Conditional Request for Constructive Assistance

If for any reason this application is not believed to be in full condition for allowance, Applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to MPEP para. 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



Shih-Jong J. Lee